

PATENT SPECIFICATION

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COMPLETE SPECIFICATION

Improvements in Automatic Coffee Making Machines and the like

We, OFFICINE CIMBALI GIUSEPPE, Soc. p. Azioni, of via A. Lecchi, 14, Milan, Italy, an Italian Company, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The technique of preparation of coffee by the cup has improved in recent years as a result of the attainment of: (a) improved flavour of the beverage in relation to the desired and predominant taste of the public; (b) the provision of apparatus whereby an operator in an establishment such as a bar during rush hours can provide for the exigencies of the service and minimise the time of preparation of each coffee beverage. Referring to (a) above, it is well known that it is preferable to avoid making the ground coffee contained within the filter come into contact with steam or water at a temperature which is above about 95° C., since at such a temperature dissolving of disagreeable substances contained within the coffee takes place, thus altering the flavour and the taste of the beverage. Referring to (b) it is required to limit the amount of time spent by an operator in preparing a coffee beverage to the very short time which is required to fill the filter with ground coffee, apply the filter and compress a spring. This has the result that the major part of the time, required by the phase of infusion, pressing, and pouring of the beverage, leaves the operator free for other activities.

The present invention is intended to solve the problem set by the construction of an automatic machine for making coffee with substantially unvarying flavour.

More particularly, if the same conditions of preparation of the coffee beverage are reproduced in the machine each time it is operated, it will produce a beverage with constant characteristics.

This invention consists of a machine for making coffee comprising at least one cylinder communicating with a source of hot water and having a plunger reciprocable therein, each

plunger having a lever associated therewith, each such lever being pivoted to a point fixed relative to the frame of the machine, connected to an actuating rod for its associated plunger, and urged by the action of a spring characterized in that each spring is anchored to the frame of the machine and each lever is connected to displacement means adapted to shift the lever against the action of said spring, a source of energy being provided arranged to actuate said displacement means.

In the attached drawing there is shown, by way of example, one form of machine having three cylinder and plunger units.

In these drawings:—

Figure 1 is a vertical section for the axis of one cylinder and plunger of the units.

Figure 2 is a plan view.

Figure 3 is one variant of one detail.

Referring to the drawing, there is shown a supporting structure 1 having a small base 2 on which there is mounted a series of platforms 3 for supporting cups or other vessels to be filled.

The chassis is constituted by three containers or units disposed alongside each other, namely right and left containers 4 disposed one on each side of a central container 5.

Each container has an hydraulic cylinder 7 incorporated therein.

The containers 4 have enclosing side walls whereas the central container 5 has no such side walls so that the three containers constitute one single fluid-tight tank. Each cylinder 7 has an open end terminating in a well shaped delivery opening 8, upon which, in a well known manner the filter holder 9 is detachably secured together with the filter 10 which is destined to receive the ground coffee. A further filter 11 constitutes the lower end of the cylinder 7, and the piston 13 normally rests against this filter. The layer of ground coffee within the filter presses against the lower surface of the filter 11.

The tank, constituted by the containers 4 and 5, is connected by a flanged pipe union 12 with a water source.

This tank forms around each cylinder 7 one

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hollow space, the inside lateral surface of which forms the wall of the cylinder. A series of ports 14 in the cylinder walls are arranged so as to communicate with the lower part of the tank when the pistons are at their highest positions in the cylinders.

This communication is interrupted by the pistons which cover these ports shortly after the commencement of their down stroke. An air valve 35 on the top of the structure 1 allows the container to fill entirely with water. The stem 15 of each piston 13 is slidably mounted through the cylinder wall and in a fluid tight manner extends through the container being coupled at 16 to a lever 17 mounted on a pivot 18 which is integral with the framework structure 1. A spring 19 connects a point of the lever 17, intermediate the piston and the coupling 16 and the fulcrum 18 with an eye 20 fixed to the base 2 and returns the piston 13 to its bottom position against the filter 11. The lever 7 is extended and coupled at 21 to the stem 22 of a small hydraulic piston 23 hereinafter described. Electric immersion heaters 24 are immersed within the tank and these are electrically connected by an electric cable in a well known manner which is not illustrated. A thermostat 28 has been provided in order that the supply of electric current to the resistances may be terminated, when the water within the container exceeds a desired temperature. A lever 25 having a handle 26 is pivoted at 27 and furnished with a cam lever 36 which if necessary, can engage below the lever 17 and lift the piston 13, when the handle is moved in the direction indicated by the arrow A.

The small piston 23, which is fluid tight, slides in a cylinder 29, mounted on the framework 1. The small piston 23 in its lowest position in the cylinder 29 corresponding to the lowest position of the piston 13 defines a dead space 30 between its lower face and the opposed bottom of the cylinder. Opening into this space is a passage 31 which communicates with a source of pressurised fluid such as steam or compressed air through a valve 32 which intercepts and regulates the passage of the fluid; on the floor of the cylinder at least one exhaust valve 33 is provided, the upper part of the cylinder 23 is in permanent communication with the atmosphere through holes 34. The passage is arranged so that the time of ascent of the piston 13 is such as to allow the hot water, which passes from the container through the holes 14 into the lower part of the cylinder 7, to remain a sufficient time in contact with the ground coffee, contained within the cylinder 10 in order to infuse the same.

When the valve 32 is closed, the pistons are urged by the action of the spring 19 to their lower dead point. If the barman opens this valve the small piston 23, again rises, lifting the piston 13, which overcomes the force of the return spring 19. When the small piston 23

reaches its highest point, automatic control means (which are not drawn for reason of simplicity, as it is obvious) close the valve 32 and open the exhaust valve 33 as a result of which under the action of the same spring 19 the piston 13 and the small piston 23 again descend.

It is obviously possible to arrange matters so that when the small piston reaches its lowest position, further control means re-open the valve 32 and close the exhaust valve 33, in consequence of which the small piston 23 again ascends and the spring 19 is stretched. At the end of the down stroke, as the valve 32 has been closed and the valve 33 has been opened, the small piston 23 again descends with the piston 13 under the action of spray 19.

Obviously it is still possible to arrange that this cycle repeats itself for a certain number of times. It is possible such as by well known cam means, to predetermine the number of times which the cycle will be repeated, i.e. to state exactly the number of coffee beverages that will be prepared, on the basis of a single initial operation by the barman. Obviously it would be possible to couple a meter and register device to the machine to indicate the number of cups of coffee prepared.

In the example described, the small piston 23 rises slowly in order to give the water which has penetrated into the cylinder 7, time to make the infusion, but as, remembering the position of the ports 14, the water enters the cylinder, only when the piston 13 has almost reached its highest point, it is advisable that the speed of ascent of the small piston 23 should be initially rapid and finally very slow. For this purpose mechanical, electric, or other means controlled by the upward stroke of the piston 13 to effect gradual closure of the valve 32 may be provided. Alternatively two valves and two ports can be provided instead of the single valve 32 and corresponding port 31. While one port allows of considerable inflow of fluid, the second port allows the least inflow. Means may be provided for opening the second port and closing the first port, when the piston has started its up stroke and as both are initially opened, means may also be provided whereby the first port closes after the first part of up stroke. The same result can be achieved by disengaging the small piston 23 from the piston 13, after lifting the latter and after small piston 23 makes a further empty stroke. Afterwards, whilst descending the small piston 23 again engages the lever 17 and therefore the piston 13.

The stretching of a spring, in the example described is effected by a compressed fluid, but there is nothing to prevent this spring from being stretched as a result of rotation of a cam, the profile of which can determine the up stroke of the piston 13 in accordance with the speed variations required, or through electric or electromagnetic means.

Generally the advantages of the improved machine concern the solution of the problem of making machines of this kind automatic in operation, but a special advantage is derived from the position of the spring 19, located externally of the tank and arranged so that it can be longer by far than in the arrangements hitherto adopted and capable of being used for a very short stroke, which is shorter than the stroke required from the pistons in order to make the infusion. For this reason the spring absorbs and transmits the energy imparted initially to it in a uniform manner which is contrary to the manner of operation of such springs which have hitherto been proposed for the purpose.

It may be further arranged that the stroke of the piston 13 and the stroke of the small piston 23, is adjustable so that the volume generated by the up stroke of the former upon the filter 10 corresponds to one or two coffee beverages.

For this purpose the ports in the wall of each cylinder are uncovered as soon as the piston leaves its lowest position (see Figure 3), but a non-return valve 36¹ is provided in consequence of which, as soon as the piston begins its down stroke, communication between the cylinder and the surrounding container is precluded.

What we claim is:—

1. A machine for making coffee comprising at least one cylinder communicating with a source of hot water and having a plunger reciprocable therein, each plunger having a lever associated therewith, each such lever being pivoted to a point fixed relative to the frame of the machine, connected to an actuating rod for its associated plunger, and urged by the action of a spring characterized in that each spring is anchored to the frame of the machine and each lever is connected to displacement means adapted to shift the lever against the action of said spring, a source of energy being provided arranged to actuate said displacement means.

2. A machine as claimed in claim 1 in which said displacement means comprises an auxiliary cylinder secured to the frame of the machine and having a lower chamber thereof connectable with either a source of fluid pressure or an exhaust conduit.

3. A machine as claimed in claim 1 or 2 in which manually operable means is provided for shifting the lever against the action of the spring as supplementary means to the displacement means in case the latter should fail.

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